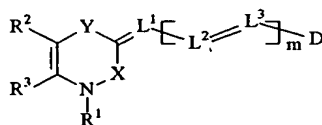
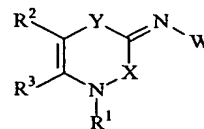


WHAT IS CLAIMED IS:

1. A dye represented by Formulae II and IIA below:



II



IIA

wherein;

R¹ represents a hydrogen, an aryl group containing 6 to 14 carbon atoms, or an alkyl group containing 1 to 12 carbon atoms;

R² and R³ together form an aromatic, carbocyclic or heterocyclic ring system containing 6 to 14 atoms;

X represents a sulfoxide (S=O), sulfone (SO₂), or dicyanovinyl (C(CN)₂) group;

Y represents a sulfoxide (S=O), sulfone (SO₂), carbonyl (C=O) or dicyanovinyl (C(CN)₂) group;

L¹, L², and L³ represent methine groups, wherein the methine groups may combine to form a 5 or 6-membered ring when m is equal to or >1

m is 0, 1, 2, or 3;

W is an aryl group; and

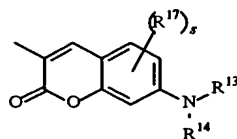
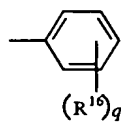
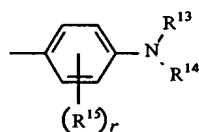
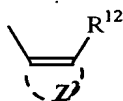
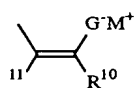
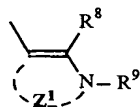
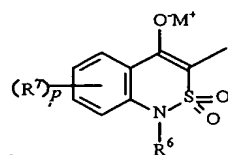
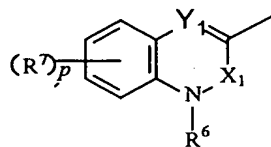
D is a moiety in conjugation with the X and Y groups.

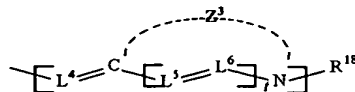
2. The dye of claim 1 wherein R² and R³ together form a benzene ring.

3. The dye of claim 1 wherein X is a sulfone and Y is a carbonyl.

4. The dye of claim 1 wherein D is a group containing a benzene ring or D contains an atom with an available electron pair positioned in conjugation with the X and Y groups, said atom being an O, N, Se, S or C with at least one electron-withdrawing group bonded thereto.

5. The dye of claim 1 wherein D is represented by the following formulae:





wherein

X_1 represents a sulfoxide (S=O), sulfone (SO₂), or dicyanovinyl (C(CN)₂) group;

Y_1 represents a sulfoxide (S=O), sulfone (SO₂), carbonyl (C=O) or dicyanovinyl (C(CN)₂) group;

R^6 is an aryl group or an alkyl group;

R^7 is independently a hydrogen or an alkyl group of 1 to 20 carbon atoms, an alkenyl group of 2 to 20 carbon atoms, an aryl, arylalkyl, heterocyclic or cycloalkyl group of 5 to 14 carbon atoms, or a hydroxy, carboxy, cyano, chloro, or nitro group;

R^8 is a hydrogen, or a carboxy, carboxyalkyl, sulfonamido, sulfamoyl, alkyl, arylalkyl, cycloalkyl, alkoxy, alkylamino, or alkylthio group;

R^9 is an alkyl group or an arylalkyl or cycloalkyl group;

R^{10} is an alkyl group of 1 to 20 carbon atoms, an alkenyl group of 2 to 20 carbon atoms, or an aryl, aralkyl, heterocyclic or cycloalkyl group of 5 to 14 carbon atoms, and R^{11} represents an electron withdrawing group, or R^{10} and R^{11} may together represent the non-metallic atoms necessary to complete a substituted or unsubstituted ring containing at least one 5- or 6-membered heterocyclic or unsaturated alicyclic nucleus;

R^{12} , R^{15} , R^{16} and R^{17} each individually represents a hydrogen, or a carboxy, carboxyalkyl, sulfonamido, sulfamoyl, alkyl, arylalkyl, cycloalkyl, alkoxy, alkylamino, or alkylthio;

R^{13} and R^{14} independently are an alkyl, alkenyl, aryl, arylalkyl, heterocyclic or cycloalkyl group, or R^{13} and R^{14} together represent the non-metallic atoms required to form a substituted or unsubstituted 5- or 6-membered ring with each other, or R^{13} and R^{14} individually represent the non-metallic atoms necessary to form a substituted or unsubstituted 5- or 6-membered fused ring with the phenyl ring to which the nitrogen is attached;

R^{18} is an alkyl, arylalkyl or cycloalkyl group;

Z^1 , Z^2 and Z^3 each individually represents the non-metallic atoms necessary to complete a substituted or unsubstituted ring system containing at least one 5- or 6-membered heterocyclic nucleus;

G is -O or -C(CN)₂;

L^4 , L^5 , and L^6 represent methine groups, wherein the methine groups may combine to form a 5- or 6-membered ring when m is equal to or >1;

M^+ is a cation;

p is 0, 1, 2, 3, or 4;

q is 0, 1, 2, 3, 4, or 5;

r is 0, 1, 2, 3 or 4;

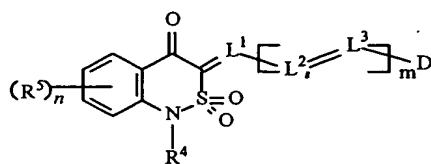
s is 0, 1, 2, or 3; and

t is 0 or 1.

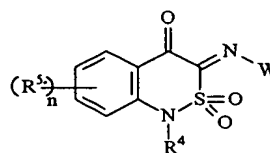
6. The dye of claim 1 wherein the dye is represented by Formula II.

7. The dye of claim 1 wherein the dye is represented by Formula IIA.

8. A dye represented by Formulae III or IIIA below:



III



IIIA

wherein;

R^4 represents a hydrogen, an aryl group containing 6 to 14 carbon atoms, or an alkyl group containing 1 to 12 carbon atoms;

R^5 is a substituent;

n is 0, 1, 2, 3, or 4;

L^1 , L^2 , and L^3 represent methine groups, wherein the methine groups may combine to form a 5- or 6-membered ring when m is equal to or >1 ;

m is 0, 1, 2, or 3;

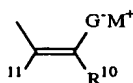
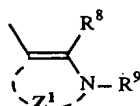
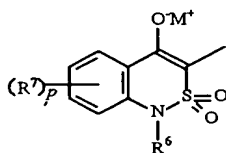
W is an aryl group; and

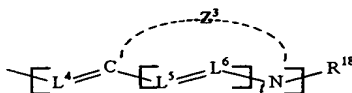
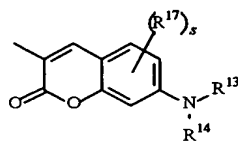
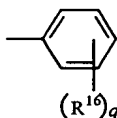
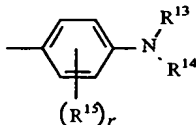
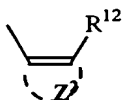
D is a moiety in conjugation with the carbonyl oxygen of the benzothiazine ring.

9. The dye of claim 8 wherein R^5 is independently a hydrogen, or an alkyl group of 1 to 20 carbon atoms, an alkenyl group of 2 to 20 carbon atoms, an aryl, aralkyl, heterocyclic or cycloalkyl group of 5 to 14 carbon atoms, or a hydroxy, alkoxy, carboxy, alkoxycarbonyl, amido, cyano, halogen, or nitro group.

10. The dye of claim 8 wherein D is a group containing a benzene ring or D contains an atom with an available electron pair positioned in conjugation with the carbonyl oxygen of the benzothiazine ring, said atom being an O, N, Se, S or C with at least one electron-withdrawing group bonded thereto.

11. The dye of claim 8 wherein D is represented by the following formulae:





wherein

R^6 is an aryl group or an alkyl group;

R^7 is independently a hydrogen or an alkyl group of 1 to 20 carbon atoms, an alkenyl group of 2 to 20 carbon atoms, an aryl, arylalkyl, heterocyclic or cycloalkyl group of 5 to 14 carbon atoms, or a hydroxy, carboxy, cyano, chloro, or nitro group;

R^8 is a hydrogen, or a carboxy, carboxyalkyl, sulfonamido, sulfamoyl, alkyl, arylalkyl, cycloalkyl, alkoxy, alkylamino, or alkylthio group;

R^9 is an alkyl group or an arylalkyl or cycloalkyl group;

R^{10} is an alkyl group of 1 to 20 carbon atoms, an alkenyl group of 2 to 20 carbon atoms, or an aryl, aralkyl, heterocyclic or cycloalkyl group of 5 to 14 carbon atoms, and R^{11} represents an electron withdrawing group, or R^{10} and R^{11} may together represent the non-metallic atoms necessary to complete a substituted

or unsubstituted ring containing at least one 5- or 6-membered heterocyclic or unsaturated alicyclic nucleus;

R^{12} , R^{15} , R^{16} and R^{17} each individually represents a hydrogen, or a carboxy, carboxyalkyl, sulfonamido, sulfamoyl, alkyl, arylalkyl, cycloalkyl, alkoxy, alkylamino, or alkylthio;

R^{13} and R^{14} independently are an alkyl, alkenyl, aryl, arylalkyl, heterocyclic or cycloalkyl group, or R^{13} and R^{14} together represent the non-metallic atoms required to form a substituted or unsubstituted 5- or 6-membered ring with each other, or R^{13} and R^{14} individually represents the non-metallic atoms necessary to form a substituted or unsubstituted 5- or 6-membered fused ring with the phenyl ring to which the nitrogen is attached;

R^{18} is an alkyl, arylalkyl or cycloalkyl group;

Z^1 , Z^2 and Z^3 each individually represents the non-metallic atoms necessary to complete a substituted or unsubstituted ring system containing at least one 5- or 6-membered heterocyclic nucleus;

G is -O or -C(CN)₂;

L^4 , L^5 , and L^6 represent methine groups, wherein the methine groups may combine to form a 5- or 6-membered ring when m is equal to or >1;

M^+ is a cation;

p is 0, 1, 2, 3, or 4;

q is 0, 1, 2, 3, 4, or 5;

r is 0, 1, 2, 3 or 4;

s is 0, 1, 2, or 3; and

t is 0 or 1.

12. The dye of claim 8 wherein the dye is represented by Formula III.

13. The dye of claim 8 wherein the dye is represented by Formula IIIA.

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